

What is claimed is:

1. A method of filling an opening in an oxide layer, over a liner layer formed on a surface of a silicide substrate underlying both the oxide layer and the liner layer, comprising the steps of:
 - forming a first continuous layer comprising silicon, on the oxide layer and on the liner layer; and
 - forming a second layer, comprising a refractory material, on the first layer so as to cover the same and to also substantially fill the opening.
2. The method according to claim 1, wherein:
 - the first layer is a continuous layer of one of amorphous or polycrystalline that has a thickness not greater than about 50Å.
3. The method according to claim 1, wherein:
 - the second layer is formed by either a physical vapor deposition (PVD) or a chemical vapor deposition (CVD) process step at a first temperature in the range 500°C to 650°C.
4. The method according to claim 3, wherein:
 - the first temperature is approximately 600°C.
5. The method according to claim 1, wherein:
 - the refractory material contains a metal selected from a group of refractory metals consisting of titanium, tantalum, molybdenum and tungsten.
6. The method according to claim 5, wherein:
 - the refractory material comprises one of the selected metals deposited as a metal, as a component of a nitride of the metal, or as a component of an alloy of the metal.
7. The method according to claim 1, wherein:
 - the first layer sacrificially protects the underlying liner and the silicide layer during the step of forming the second layer.
8. The method according to claim 7, wherein:
 - the first layer serves as a nucleation layer for deposition of the second layer thereon.

- 7 9. The process according to claim 3, wherein:
8 a second layer is formed at a second temperature that is lower than the first
9 temperature.
- 10 10. The method according to claim 8, wherein:
11 the first layer is a continuous polysilicon layer that has a thickness not greater
12 than about 50Å.
- 13 11. The method according to claim 10, wherein:
14 the second layer is formed by either a physical vapor deposition (PVD) or a
15 chemical vapor deposition (CVD) process step at a first temperature in the range 500°C to
16 650°C.
- 17 12. The method according to claim 11, wherein:
18 the refractory material contains a metal selected from a group of refractory metals
19 consisting of titanium, tantalum, molybdenum and tungsten.
- 20 13. The method according to claim 12, wherein:
21 the refractory material comprises one of the selected metals deposited as a metal,
22 as a component of a nitride of the metal, or as a component of an alloy of the metal.
- 23 14. The method according to claim 13, wherein:
24 the first layer sacrificially protects the underlying liner and the silicide layer
25 during the step of forming the second layer.
- 26 15. The method according to claim 14, wherein:
27 the first temperature is approximately 600°C; and
28 the second layer is formed at a second temperature that is lower than the first
29 temperature.
- 30 16. A multilayer structure, comprising:
31 a silicide layer, having a first surface;
32 an oxide layer, formed on the first surface and having a second surface, with an
33 opening through the oxide layer defined by an opening wall extending from the second
34 surface to the first surface;
35 a liner layer, formed on the first surface at a bottom of the opening;
36 a continuous silicon layer, formed to extend over the second surface, the opening
37 surface and the liner layer; and
38 a refractory material layer, formed on the silicon layer and substantially filling the

opening.

17. The structure according to claim 16, wherein:

the first layer is a continuous polysilicon layer that has a thickness not greater than about 50Å; and

the second layer is formed by either a physical vapor deposition (PVD) or a chemical vapor deposition (CVD) process step at a first temperature in the range 500°C to 650°C.

18. The structure according to claim 17, wherein:

the refractory material comprises a metal selected from a group of refractory metals consisting of titanium, tantalum molybdenum and tungsten; and

the refractory material comprises one of the selected metals deposited as a metal , as a component of a nitride of the metal, or as a component of an alloy of the metal.

19. The structure according to claim 18, wherein:

the first layer sacrificially protects the underlying liner and the silicide layer during the step of forming the second layer; and

the first layer serves as a nucleation layer for deposition of the second layer thereon.

20. The structure according to claim 19, wherein:

the first temperature is approximately 600°C; and

the second layer is formed at a second temperature that is lower than the first temperature.

21. The method according to claim 1, wherein:

the first layer is formed by a chemical vapor deposition (CVD) process and extends continuously on the oxide layer, a wall of the opening and the liner layer.

22. The method according to claim 1, wherein:

the liner layer comprises at least one of titanium, titanium nitride, tungsten, and an alloy of titanium and tungsten.

23. The method according to claim 1 wherein said first silicide layer is formed on a silicon substrate.

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